

50 CONGRESS STREET.

Boston, March 21, 1912.

William Brewster, Esq.,
Cambridge, Mass.

Dear Mr. Brewster:-

Many thanks for your article, which I have just been reading with keen interest. You seem to have had an exceptionally good opportunity of witnessing one the mysteries of natural mechanics which has always tantalized curious minds. The solution of the birds' gliding upon rising currents is an obvious one, but is not necessarily the only one. The air is really an undiscovered country, and even the best informed men have a great deal to learn about it, apparently.

I have been flying kites and building gliders for some years and am in the midst of a study of the properties of the air relative to the support and propulsion of such bodies. I have watched the gulls attentively for years, from steamers and from the shore. In stormy weather along the **Maine** coast they love to

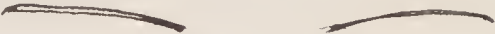
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collect on the windward side of an island where the shore is bluff and play in the rising currents caused by the lift of the land. They undoubtedly employ these means in following the boats, but it may well be that this is not the whole story. It requires very little elevation in the course of the wind to enable a bird to soar upon it, for they are masters of the art. The whole truth will be learned sooner or later, I suppose, and meanwhile such careful observations as those of your paper will materially help. The carrying forward of the centre of gravity relative to the centre of support as the force of the wind increases is theoretically sound. To make the whole business scientifically clear, however, is more than anyone has yet accomplished, I believe.

There are so many elements involved. There is the question of the form, the relations of surfaces in space. The common anemometer owes its spinning motion to the difference in effective pressure upon concave and convex surfaces of equal projected area. Has this general fact an application? Then there is the question of possible reactions from one part of the surface upon other parts, as from the underside of the wings up against the stern and tail, which

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would have an advancing effect. Then alternations in the density of the air, and in its velocity, may be utilized by variations of muscular pressure not observable as such. That advantage is taken of everything we may be quite sure, -and the factors are many, beside the admitted one of favorable lift.

In the gliders I am experimenting with, and which are an invention or discovery of my own, one plane is placed behind another and on the same level but both inclined downward slightly towards each other, like this in fore and aft section: 

There is a reaction from the first which has an upward trend so that the second seemingly glides upon it as bird on a rising current, and receives support and forward propulsion. They are very suggestive, and give promise of practical results in the future.

Perhaps we may have an opportunity to discuss these things at some time more directly, if Kennard arranges the meeting he spoke of to me.

Thanking you once more, I am

Cordially yours,

Robert W. Anderson

(Answer delayed in sending.)